राष्ट्रीय प्रौद्योगिकी संस्थान वारांगल

National Institute of Technology Warangal

Hanamkonda, Warangal-506004, Telangana

Senate Minutes

Meeting No.:	140
Date:	22nd January 2025
Time	16.30 hours
Venue:	Senate Hall, NIT Warangal

Minutes of 140th Meeting of the Senate held on 22nd January 2025

Prof. Bidyadhar Subudhi, Chairman
Director, NIT Warangal

Prof. N.V. Umamahesh
Registrar (I/c), NIT Warangal

Members Present:

1. Prof. A. Benerji Babu (MA)
2 Prof. A. Sarath Babu (CH)
3 Prof. A. Venu Gopal (ME)
4 Prof. A. Venu Vinod (CH)
5 Prof. Adepu Kumar (ME)
6 Prof. Arif Ali Baig Moghal (CE)
7 Prof. Ashok K. Pradhan, IIT KGP
8 Prof. B. Sri Padmavati, UOH
9 Prof. B.L. Narasimha Raju (EE)
10 Prof. Bhagwan K. Murthy (EE)
11 Prof. C. Vanitha (MM)
12 Prof. C.S.R.K. Prasad (CE)
13 Prof. Ch. Sudhakar (CS)
14 Prof. Ch. Venkaiah (EE)
15 Prof. D. Jayakrishna (ME)
16 Prof. D. Kasinath (CY)
17 Prof. D. Ramaseshu (CE)
18 Prof. D. Srinivasa Charya (MA)
19 Prof. D. Vakula (EC)
20 Prof. D.V.S.S. Siva Sarma (EE)
21 Prof. Debashis Dutta (MA)
22 Prof. Divi Haranath (PH)
23 Prof. G. Amba Prasad Rao (ME)
24 Prof. G. Nagasrinivasulu (ME)
25 Prof. G.V.S. Nageswara Rao (MM)
26 Prof. Hari Ponnamma Rani (MA)
27 Prof. J.V. Ramana Murthy (MA)
28 Prof. K. Anand Kishore (CH)
29 Prof. K. Kiran Kumar (ME)
30 Prof. K. Madhavi (HS)
31 Prof. K. Narasimhulu (BT)
32 Prof. K. Thangaraju (PH)
33 Prof. K. Venkata Reddy (CE)
34 Prof. KNS Kasiviswanadham (MA)
35 Prof. L. Anjaneyulu (EC)
36 Prof. L. Krishnanand (ME)
37 Prof. M. Heera Lal (CE)
38 Prof. M. Joseph Davidson (ME)
39 Prof. M. Sailaja Kumari (EE)
40 Prof. Mahesh Kumar Talari (MM)
41 Prof. N. Bheema Rao (EC)
42 Prof. N. Kishore Babu (MM)
43 Prof. N. Narasaiah (MM)
44 Prof. N. Selvaraj (ME)
45 Prof. N. Viswanathan (EE)
46 Prof. N.V. Srikanth (EE)
47 Prof. N.V. Umamahesh (CE)
48 Prof. P. Abdul Azeem (PH)
49 Prof. P. Bangaru Babu (ME)
50 Prof. P. Hari Krishna (CE)
51 Prof. P. Hari Prasada Reddy (CE)
52 Prof. P. Muthu (MA)
53 Prof. P. Ramlal (MS)
54 Prof. P. Ratish Kumar (CE)
55 Prof. P. Ravi Kumar (PE)
56 Prof. P. Sreehari Rao (EC)
57 Prof. P. Sreenivasa Rao (BT)
58 Prof. P. Subhash Chandra Bose (ME)
59 Prof. P. Syam Prasad (PH)
60 Prof. P. Vamsi Krishna (ME)
61 Prof. P. Venkata Sri Laxmi (CY)
62 Prof. P. Venkata Suresh (CH)
63 Prof. P. Venkateswara Rao (CE)
64 Prof. Pisipati Radha Krishna (CS)

65 Prof. Puli Ravi Kumar (ME)
66 Prof. R. Narasimha Rao (ME)
67 Prof. R. Padmavathy (CS)
68 Prof. R. S. Selvaraj (MA)
69 Prof. R.B.V. Subrahmanyam (CS)
70 Prof. Rashmi Ranjan Rout (CS)
71 Prof. Ravi Kumar Jatoth (EC)
72 Prof. S. Ravichandra (CS)
73 Prof. S. Srinivasa Rao (EE)
74 Prof. S. Venkateswara Rao (CE)
75 Prof. Sonawane Shirish Hari (CH)
76 Prof. Srikanth Korla (ME)
77 Prof. T. Kishore Kumar (EC)
78 Prof. T. Venkatappa Rao (PH)
79 Prof. V. Hari Kumar (ME)
80 Prof. V. Ramana Murthy (CE)
81 Prof. V. Suresh Babu (ME)
82 Prof. V. Venkata Mani (EC)
83 Prof. V.P. Chandra Mohan (ME)
84 Prof. V.T. Somasekhar (EE)
85 Prof. Vangapandu Rama Devi (MS)
86 Prof. Velagapudi Vasu (ME)
87 Prof. Venkaiah Chowdary (CE)
88 Prof. Venkatathri Narayanan (CY)
89 Prof. Vishnu Shanker (CY)
90 Prof. Y. Ravi Kumar (ME)

Special Invitees:

1 Prof. B. Rama Raju (Head, BT)
2 Prof. M. R. Viswanadhan (Head, HS)
3 Prof. S. Vidyasagar, (Head, CH)
6 Prof. Santhosh P. (Head, CY)
7 Prof. Sunitha G (Head, MS)
8 Prof. D. Bhargavi (AD-PG)

Student Representative:

1. Mr M Navaneeth, Roll No. 21PHRER02

The following members could not attend the meeting:

1 Prof. A. Veeresh Babu (ME)
2 Prof. Amit Prashant, IIT GN
3 Prof. Asit Kumar Khanra (MM)
4 Prof. B. Lakshmi (EC)
5 Prof. B. Sathish Ben (ME)
6 Prof. C.S.P. Rao (ME)
7 Prof. G. Rajesh Kumar (CE)
8 Prof. K. Ramesh (CS)
9 Prof. K.V. Gobi (CY)
10 Prof. K.V. Sai Srinadh (ME)
11 Prof. M. Chandrasekhar (CE)
12 Prof. NVSN Sarma (EC)
13 Prof. R. Satish Babu (BT)
14 Prof. S. Anuradha (EC)
15 Prof. S. Srinath (CH)
16 Prof. S. Srinivasa Rao (ME)
17 Prof. Sourabh Roy (PH)
18 Prof. T.D. Gunneswara Rao (CE)
19 Prof. V. Rajesh Khana Raju (ME)

Leave of absence was approved for all the members who could not attend.

The Chairman, Senate welcomed all the Senators.

Part-A [In the presence of Student Representatives]

2025-140-Senate-01	Item Related to Student Activities

(a) Request of Mr. Hritik Kumar for Re-admission

Mr. Hritik Kumar took admission into B.Tech Program in CS in 2020. In the first Semester itself he suffered with health problem related to adverse psychological state of mind during COVID period and he had to undergo a prolonged medical treatment for almost four years. Due to above said health problem, he was unable to continue with his study. Doctor gave a report that he has fully recovered and fit to take up studies. As per the Institute regulations, maximum duration to complete the B.Tech programme is restricted to EIGHT years only.

He made a request to grant fresh admission in Academic Session 2025-2029. The request is forwarded to the SUGC for its comments.

The SUGC, after reviewing the request and the medical reports submitted by Mr. Hritik Kumar, and considering the medical challenges faced by the student, recommends the following as a special case:

(i) He may be allowed for re-admission in the AY: 2025-26, commencing from July 2025.

(ii) The maximum eight-year duration for completing the B.Tech program may be extended beyond Eight years, as he will enter into ninth year since his initial admission by the time he completes the program over the next four years.

The Senate discussed the appeal critically and observed the following:

a) The student did nor even study a single semester and only attended one month.

b) The student or his parents/guardians have not made the Institute aware about the situation to give the Institute an opportunity to suggest a solution. The request came after a long time, i.e., just few days before this Senate meeting.

c) There is no provision to allow the student for fresh admission.

In view of the above, the Senate declined the request for re-admission.

(b) Request of Ms. Amala K.P. for continuance of her PhD program

Ms. Amala K. P., Roll No. 21CYRER08, a Full-time Research Scholar (CY) has completed 3 years. Recently she has been offered a position at Nuclear Power Corporation of India Limited as a Scientific Assistant B, and is advised to the Organization before 01 February 2025 and undergo a mandatory training program for one and a half years. The terms of the Organization do not permit her to simultaneously pursue the PhD program and training.

She made a request for permission to temporarily withdraw from the PhD program for a period of two years, starting from January 2025 or till the completion of training

program and also to permit her for resuming the PhD program as a part-time student after the withdrawal period. The request is referred to RPEC for its recommendation.

The RPEC recommends for withdrawal for a period of two years as a special case. After the training period, if the Organization has no objection, she may be permitted to continue her PhD program in Part-time mode.

Considering the career of the student and genuineness of the appeal, the Senate approved the request for 2-years withdrawal and permitted to register under Part-time after the withdrawal period.

(c) Request of Ms. Sure Mamatha

Ms. Sure Mamatha, (Roll No. 23CSR1P03), a Part-time Research Scholar (CS) has made a request for extension of one semester for appearing in the Comprehensive Viva Voce on Medical Grounds.

The RPEC noted that the candidate is suffering with knee injuries resulting from a bike accident and the case was recommended by the Doctoral Scrutiny Committee. The RPEC recommends granting an extension of one semester for the comprehensive viva on medical grounds, as a special case.

The Senate approved the recommendations of RPEC and allowed the scholar for appearing the Comprehensive Viva Examination considering the medical exigency.

PART-B [Without the presence of the Student Representatives]

2025-140-Senate-02	**Action Taken report on the decisions taken in 139th Senate meeting**

2024-139-Senate-01	Ms. P. M. Pooja (Roll No. 22PHR1R03), a Full time Institute fellow in the Department of Physics has made a request to permit her to discontinuing in the PhD program.	Admission Cancellation Order has been issued.
2024-139-Senate-03	Confirmation of the minutes of 138th Senate meetings	The minutes of 138th Senate meeting confirmed by the Senate have been uploaded on the Institute website.
2024-139-Senate-04	The decision to convert the registration of Mr. Challa Krishna Teja, Roll No. 721074, Research Scholar of MM and Mr. Monex Sharma, Roll No. 719061, Research Scholar of ME from Full time to Part time has been ratified. The request of Ms. Korimi Prathyusha, Roll No. 21HSRER03,	Noted Ms. Prathyusha has registered as a Part-time PhD student in this semester.

	Research Scholar of HS for conversion of her registration from Full Time to Part Time has been approved by the Senate.	
2024-139-Senate-05	Results of Ph.D. Viva Voce Examination	Noted
2024-139-Senate-06	Approval of Results of all Academic Programs for Autumn Semester of 2024.	Results of all the programs have been published. The Departmental Academic Appeals Committee (DAAC) and DAC(UG) and DAC(PG&R) recommendations for Grade Changes have been approved by the Chairman, Senate. Accordingly, the Grades have been updated.
2024-139-Senate-07	Proposal to start a New Academic Department/Interdisciplinary Centre.	Noted. The decision is placed before the BOG for information.
2024-139-Senate-08	Modalities for 6 months internship followed by performance based placement offers for B.Tech students.	The recommendations of the Committee, approved by the Senate are being implemented.
2024-139-Senate-09	Academic Calendar for BSc. Bed. for Spring Semester of 2024	The Academic Calendar approved by the Senate has been uploaded on the Institute website.
2024-139-Senate-10	Modifications in the PhD regulations	The regulation has been modified with a restriction that that a maximum allowable gap of three months between the Synopsis and Thesis submission.
2024-139-Senate-11	Any other Item: Re-end examination for four courses of a student of EE.	The re-examination schedule has been announced.

The Senate noted the action taken report.

2025-140-Senate-03	**Confirmation of the minutes of 139th Senate meeting**

The minutes of the 139th meeting of the Senate were circulated to all the senators. The comments received from the Senators were incorporated.

The Senate confirmed the minutes of the 139th Senate Meeting.

2025-140-Senate-04	**Items for Ratification**

a) Mr. Deshaboina Harshavardhan, Roll No. 24CSR2R03 is working in the CSIR sponsored project "High resolution image reconstruction using nature inspired meta heuristics for long objects" with Prof. Manish Bajpai (PI) from September 2024 in the Department of

Computer Science and Engineering. Mr. Deshaboina has done his B.Tech. and M.Tech. in EC. As the candidate has B.Tech and M.Tech in EC, the Chairman, Senate referred this to a Committee. The committee observed that the Candidate has been working in the research area of Image Processing and therefore recommended for his PhD admission in CS. The recommendation of the Committee has been approved by the Chairman, Senate.

b) Ms. Sadhana Vangapalli, Roll No. 23CER1R02, full time research Scholar (CE) has made a request for change of Supervisor. The request has been considered by the DSC and recommended to change the Supervisor, owing to the research area of the new Supervisor aligns with the PhD problem.

Present Supervisor : Prof. P. Sridhar and Prof. P. Venkateswara Rao

New Supervisor : Prof. P. Hari Prasada Reddy

The recommendation of the DSC has been approved by the Chairman, Senate.

c) Mr. Teshome Gebreyohannes Selamu, Roll No. 22CER1F01, a Full-time scholar under ICCR in CE has made a request for change of Supervisor. The request has been considered by the Department and recommended to change the Supervisor.

Present Supervisor : Prof. G. Rajesh Kumar

New Supervisor : Prof. Arif Ali Baig Moghal

d) The Department of Physics has made a request to the Chairman, Senate to include two new electives, namely (1) Advanced Quantum Mechanics and (2) Dynamical Systems for Integrated MSc students from the next Academic Year. The DAC(PG&R) of the Department has recommended the request. The Chairman, Senate has approved the recommendation of DAC PG&R.

The Senate ratified the above decisions of the Chairman, Senate.

e) Conversion of JRFs/SRFs working under Projects to Institute Fellows

The RPEC has made the following recommendations with regard to the above considering completion of 2 years in Sponsored Project and the performance. Those JRFs admitted for PhD program without GATE score as a special case, their cases may be considered subject to qualifying in a written test to be conducted by the Department with questions from external experts from nearby IITs.

S.No.	Roll No.	Name of the Scholar	RPEC Recommendations	Date from which fellowship is recommended	Date up to which it is recommended

(1)	(2)	(3)	(4)	(5)	(6)
1	22ECR2R08 PH24104043	Bochu Lakshkoti	Recommended	01-01-2025	18-08-2027 or until the submission of the thesis, whichever is earlier.
2	22MER2R05	Boddeti Jagadish	Recommended	01-01-2025	30-07-2027 or until the submission of the thesis, whichever is earlier.
3	22ECR1R10 PH24104013	Malothu Naresh	Recommended	16-03-2025	24-05-2027 or until the submission of the thesis, whichever is earlier.
4	21CHRER06	Sivaprakah S.	Recommended	29-12-2024	08-09-2026 or until the submission of the thesis, whichever is earlier.
6	23CHR1R06 PH24106014	Priyanka Jaganade	Recommended*	31-03-2025	30-03-2028 or until the submission of the thesis, whichever is earlier

- *Subject to qualifying in the written test.*

The Senate approved the conversion of JRFs to Institute fellows as recommended by RPEC.

2025-140-Senate-05	**Results of Ph.D. Viva Voce Examination**

The results of the following Ph.D. students who have been provisionally awarded degrees after 139th Senate meeting held on 23-12-2024 on approval of the Chairman, Senate is placed before the Senate for information.

PhD Results		
1	**Mr. Cherukupally Rajesh**	
	Department	**CE**
	Roll No.	**718008**
	Date of Viva-voce Examination	06.01.2025
	Foreign Examiner	Dr. TAN Kiang Hwee, Emeritus Professor, University of Singapore
	Indian Examiner	Prof. J. M. Chandra Kishen Indian Institute of Science, Bangalore
	Supervisor(s)	Prof. G. Rajesh Kumar
	Thesis Title	A Study on Shear Behaviour of Higher Strength Concretes
2	**Mr. Gummadi Chiranjeevi**	
	Department	**CE**
	Roll No.	**720028**
	Date of Viva-voce Examination	15.01.2025
	Foreign Examiner	Dr David Woodward, Ulster University, Ireland
	Indian Examiner	Prof. Dharamveer Singh, IIT Bombay
	Supervisor(s)	Prof. S.Shankar
	Thesis Title	Influence of Aggregate Gradation on Permeability, Clogging and Performance of Porous Asphalt Mixtures

3	**Mr. Sukh Das Ahirwar**	
	Department	**EC**
	Roll No.	**701945**
	Date of Viva-voce Examination	20.01.2025
	Foreign Examiner	Prof Arokiaswami Alphones, Nanyang Technological University,Singapore
	Indian Examiner	Dr. Debalina Ghosh, IIT Bhubaneswar
	Supervisor(s)	Prof. A. Prakasa Rao
	Thesis Title	Investigations on Broadband Planar EBG Structures for Low
4	**Mr. Bhukya Balaji**	
	Department	**ME**
	Roll No.	**719062**
	Date of Viva-voce Examination	20.01.2025
	Foreign Examiner	Dr. Anutosh Chakraborty, Nanyang technological University Singapore
	Indian Examiner	Prof. E. Anil Kumar, IIT Tirupati
	Supervisor(s)	Prof. A. Veeresh Babu
	Thesis Title	Experimental Investigation of a Novel Quaternary Blend in a CRDI Diesel Engine: Performance, Emission, and Combustion Characteristics under Varying Operational Parameters
5	**Mr. Satish Jain**	
	Department	**ME**
	Roll No.	**701923**
	Date of Viva-voce Examination	20.01.2025
	Foreign Examiner	Dr. Murali M. Yallapu, University of Texas Rio Grande Valley
	Indian Examiner	Prof. Inderdeep Singh, IIT Roorkee.
	Supervisor(s)	Prof. Raghavendra Gujjala and Prof. Abdul Azeem P,
	Thesis Title	In-vitro Bioactivity, Mechanical, and Tribological Studies of Eco-Friendly Synthesized Borosilicate Glass for Tissue Engineering Applications

The Senate noted the results of the Ph.D. students.

2025-140-Senate-06	**Adoption of UG Minor Program in Quantum Technologies**

Under the aegis of the National Quantum Mission (NQM), the DST in collaboration with the AICTE has developed a comprehensive Undergraduate Minor Program in the field of Quantum Technologies. This Program aims to provide undergraduate students with a foundational understanding of quantum principles and their applications, empowering them to engage with emerging quantum technologies. The proposed structure of the Minor Program is placed at Annexure-1.

The Senate in principle approved the proposal and suggested that three Departments of CS, EC and PH are advised to prepare the detailed structure of the Minor program and submit it to the Chairman, Curriculum Development Committee.

2025-140-Senate-07	**Senate Protocol**

The Senate appointed a Committee with members (1) Prof. Venkaiah Chowdary (2) Prof. DVSS Siva Sarma and (3) Prof. D. Kasinath. The Committee was requested to prepare the draft Senate

Protocol by taking inputs from different IITs, NITs and the Senators. The draft Senate protocol prepared by the Committee is placed at Annexure-2.

The Senate discussed the draft protocol and approved it.

2025-140-Senate-8	**Guidelines for Change of Supervisor**

Currently there are no guidelines in Academic Regulations for consideration of the request made by Scholars for change of supervisor. The Senate advised the RPEC to present a proposal for aiding towards deciding the request for change of supervisor. The guidelines proposed by RPEC are placed at Annexure-3.

The Senate discussed the guidelines and approved the same.

2025-140-Senate-9	**Revised Grading Policy**

Observing the results of 1st Semester students admitted in the AY 2024-25, the Chairman, Senate has advised both the SUGC and SPGC to review the evaluation guidelines and propose modifications, if necessary. The recommendations of the SUGC and SPGC are given below.

The SPGC and SUGC have made the following recommendations:

1. *Marks for the attendance*
   The following bands are suggested for awarding marks for attendance for the cases of more than minimum attendance of 80%

81 – 85	*1*
86 – 90	*2*
91 – 95	*3*
96 – 100	*5*

   The attendance percentage can be rounded off to next higher digit only if decimal value is greater than 0.5
2. *It is suggested to retain the "U" grade, as it boosts the morale of the student, apart from giving a small benefit of increase in SGPA/CGPA which will be helpful for placements or internship cut-off. In any case, the "U" grade will be replaced by the actual grade later. The "U" grade(s) in any way does not contribute to a larger increase in CGPA.*
3. *It is felt that the flexibility to alter the grade ranges be given to the teachers. However, instead of +/- 10 marks; +/- 5 marks change with respect to pure absolute, may be considered for theory subjects (i.e., pass mark of minimum 35).*
   For projects/Activity based / Labs it is recommended to follow the pure absolute grading policy with no flexibility.
   The teachers should record justification, if the class average is < 50 or > 70 for theory courses and >75 for lab courses.

4. *All these changes are recommended from the next semester.*

The Senate approved the recommendations of SUGC and suggested to implement the above recommendations from the AY 2025-26. However the Senate suggested the following distribution of marks: (1) Attendance: 5% (2) Teacher's Assessment: 15% (3) Minor-1: 20% (4) Minor-2: 20% and (5) Major Exam: 40%.

However, in the current Semester, the marks for the attendance will be considered as shown in the following table:

≤ 80	*0*
81 – 85	*2*
86 – 90	*4*
91 – 95	*7*
96 – 100	*10*

2025-140-Senate-10	Senate Nomination for Board Members

The Chairman, Senate has constituted a Committee with (1) Prof. V.T. Soma Sekhar (2) Prof. PV Suresh and (3) Prof. S. Anuradha to review the practices for nominating a Board Members by the Senate. The Committee has submitted its recommendations to the Chairman, Senate. The recommendations of the Committee are given in Annexure-4.

The Senate approved the proposal and nominated the Search and Selection Committee with the following members:

1. *Prof. N. V.* Umamahesh, CE (Chairman)
2. Prof. A. K. Pradhan, IIT Kharagpur (Member)
3. Prof. V. V. Mani, EC (Member)
4. Prof. R.S. Selvaraj, MA (Member)
5. Prof. D. Kasinath, CY (Member)

The Search and Selection Committee will nominate Board Member under Professor category and recommend three names to the Chairman, Senate. The Senate authorized the Chairman to nominate the first name in the list recommended by the Committee as the Board Member.

2025-140-Senate-11	Organization of Annual Convocation

As a result of a large number of students participating in the Convocation (approximately 1500), the following proposal is submitted by the Dean (Academic).

a) Organize the Annual Convocation on a single day for PhD students and Gold Medalists. The degrees of UG and PG students may be handed over in the respective Departments.

(or)

b) Organize the Annual Convocation in two phases: Phase-1: for PhD and PG students; Phase-2: for UG students. Both the phases may be organized on two different days or one in the morning and the other in the afternoon of the same day.

For the convenience of students, it is proposed to schedule the Annual Convocation during the weekend of the last week of November Month every year and display it in the Academic Calendar.

The Senate approved the proposal to organize the annual convocation on two consecutive days and approved the proposed schedule to organize the next convocation* during the weekend of the last week of November *for the 23rd Convocation.

2025-140-Senate-12	**Residential Requirement for Part-Time Scholars**

The Chairman, Senate advised the RPEC to propose revised guidelines for residential requirement for Part-Time Scholars. The RPEC Recommends the following:

a) The DSC can recommend for waiver of residential requirement for part-time research scholars having a minimum experience of FIVE years
b) The DSC recommendations shall be sent to RPEC for its comments. The RPEC after careful scrutiny of the DSC recommendations and communicate its comments and recommendations to Dean (Academic).
c) The Dean (Academic) approves the recommendations of the RPEC.

The Senate approved the recommendations of the RPEC.

2025-140-Senate-13	**Report of SPGC on some of the PG curricula**

The SPGC has observed some gaps or lack of clarity on curricula of PG programs and suggested guidelines. The guidelines proposed by SPGC are given in Annexure-5.

The Senate approved the guidelines proposed by SPGC. The Senate suggested SPGC to come up with detailed guidelines to evaluate Dissertation works carried out in the Industries.

2025-140-Senate-14	**Autumn Semester Results of BSc. BEd.**

The autumn semester results of BSc. BEd. have been presented to the Senate. The Coordinator for ITEP program has presented the analysis of results to the Senate.

The Senate approved the Autumn semester results of 1st Semester BSc. BEd. program.

The meeting ended with thanks to the Chair.

Prof. N. V. Umamahesh
Registrar (I/c) & Secretary

Prof. A. Sarath Babu
Dean, Academic

Prof. Bidyadhar Subudhi
Director & Chairman

Annexure-1

Course Structure of UG Minor Program on Quantum Technologies

Preamble:

Quantum technology is an emerging new paradigm that promises to disrupt and revolutionize computing, communication and sensing in the coming decades. Keeping in mind the immense strategic potential, and possibilities for unforeseen breakthroughs in research, the global investment from Governments alone exceeds 40 B$. In the Indian context, the National Quantum Mission from the Government of India is a decisive step in accelerating the nation's research in this field. To fulfil the mandates of the mission, India needs to develop a highly skilled workforce through immediate initiatives in teaching and training. The training imparted to this workforce must enable them to reach global standards, and simultaneously address the multi-disciplinary needs of quantum technology development -- from core hardware and back-end engineering support to algorithms for cryptography and machine learning. To create a thriving quantum-trained ecosystem in India it is thus imperative to introduce a dedicated curriculum at the undergraduate level, as well as at the post graduate level, along with programmes for faculty members and teachers involved in undergraduate and post graduate education. While institutes of national importance have begun programs to this end, expanding such training to a larger pool of institutes across the country enables the nation to tap into the vast resource of students who can then participate in the mission to accelerate its progress towards its goals.

In this context we propose the course structure for a minor program in Quantum Technologies at the undergraduate level. Here we consider Quantum Technologies to include all four verticals -- Quantum computation and simulation, Quantum communications and cryptography, Quantum sensing, Quantum materials and devices. We propose a curriculum spanning a minimum of 18 credits. We propose both theory and lab courses in this curriculum. We assume each course amounts to 3 credits (1 credit translating to 1 in-class contact hour per week for a theory course or 1 session of lab for 3 hours for a lab course), thereby making the minor program span a minimum of 6 courses. We propose a pool of courses amounting to 30+ credits, out of which any given institution may choose 18 credits depending on the availability of teachers in that institution. However, to retain the core mandate of the minor, we propose to make a couple courses mandatory. This flexibility in the curriculum, we believe, will allow institutions to readily start training students in one or more verticals of quantum technologies. We also believe that many of the listed courses may also be chosen as electives by students who do not opt for a minor in quantum technology. We also encourage institutions and students to incorporate project-based learning approaches wherever possible to enhance the impact of the curriculum.

We have designed the curriculum keeping in mind the diversity in the institutions, as well as the different engineering disciplines. We believe that this minor program can be taken up by students of ALL engineering disciplines from their third or fourth semester (assuming an 8 semester or 4-year undergraduate program as the standard format). The students undertaking this course need to be familiar with basic engineering mathematics (basic linear algebra, complex numbers, probability and statistics) and physics at high school level (newton's laws, optics, thermodynamics), along with the basics of programming (simple arithmetic

operations, basic sorting and search algorithms). These basic prerequisites are easily met by most students after their first year of undergraduate engineering/science education. We designed the curriculum to contain a quick review of all the requisite basics to acknowledge the possibility that some students may not have them covered and still want to pursue this minor.

We believe that extensive training programs for teachers are necessary to enable them to do justice to the goals of the minor program. Such sustained teacher training efforts will also enhance the quality of the training imparted to students over the years leading to long-term benefits and enable India to become a world leader in this field. We also believe that a textbook writing exercise should be carried out, such that topics in quantum technologies

Proposed structure of the program:

Minimum credits to fulfil – 18

- A 3:0 course amounts to at least 36 hours of lectures (considering holidays, exam days etc) per semester, assuming an average length of 14 weeks for the semester.
- A **n:m** lab course has **n** hours of lectures and **m** sessions (2 hours each) of lab per week.
- The proposed course structure is only to provide a guideline. Based on the available teaching resources, an institute may choose to add more modules, having covered the ones mentioned here.
- Project Based Learning (PBL) is encouraged and institutes must try to incorporate projects related to the domain of the minor degree wherever possible.

Table of Courses

Course code	Title	Credits (Theory: Lab)
QT 01 and QT 02 are both Mandatory		
QT 01	Survey of Quantum technologies and Applications	3:0
QT 02	Foundations of Quantum Technologies	3:0
At least one of QT 03 and QT 04 is Mandatory		
QT 03	Basic Programming Lab	2:1
QT 04	Basic Laboratory Course for Quantum Technologies	2:1
At least one of QT 05, QT 06, QT 07, QT 08 is Mandatory		
QT 05	Introduction to Quantum Computation	3:0
QT 06	Introduction to Quantum Communication	3:0
QT 07	Introduction to Quantum Sensing	3:0
QT 08	Introduction to Quantum Materials	3:0
Optional / Additional Courses		
QT 09	Engineering Foundations of Quantum Technologies	3:0
QT 10	Solid State Physics for Quantum Technologies	3:0
QT 11	Quantum Optics	3:0

Prerequisites for all courses:

Engineering Mathematics (Linear Algebra, Complex algebra, basics of 2nd of ODEs and initial value problems, 2nd order PDEs and boundary value problems, Probability and Statistics, Random variables). Maxwell's equations and EM theory at the level of the core physics syllabus from AICTE model curriculum.

Detailed Syllabus

QT 01: Survey of Quantum Technologies and Applications 3:0 (Mandatory)

This course is meant to give an overview of the field of quantum technologies and make the students familiar with the state-of-the-art in all four verticals. The emphasis is not on depth in this course, but on covering the exciting aspects of the field.

Course Content and syllabus:

- Quantum Technologies – four verticals (1 lecture)
    - Motivation for Quantum Technologies
- A qualitative overview of salient aspects of quantum physics (4-5 lectures)
    - Quantum States, Wavefunctions, Probabilistic interpretation
    - Physical observables, Hermitian operators, expectation values
    - Heisenberg uncertainty principle
    - Schrodinger equation, Time evolution
    - distinction from classical physics
    - Heuristic description of Superposition, Tunnelling and entanglement
    - No cloning theorem
    - Simulating classical systems – Feynman's idea of a quantum simulator and the birth of the field
- Quantum Computation (10-12 lectures)
    - Basics of qubits -- what is a qubit?
    - How is it different from a classical bit? – Review of classical logic gates
    - Di Vincenzo criteria for realising qubits
    - Basics of qubit gates and quantum circuits
    - Physical implementation of qubits (very qualitative description)
        - Solid State Qubits
            - Semiconducting Qubits – quantum dots, spins
            - Superconducting Qubits – charge, flux and phase
            - Topological Qubits – proposals and advantages
        - Atoms and Ions
            - Trapped ions
            - Rydberg atoms
            - Neutral atoms
        - Photonic Qubits
            - Conventional linear optical setups
            - Integrated Photonics
        - NMR qubits
            - Conventional NMR qubits
            - NV centres
    - Overview of applications and recent achievements

        - RSA and Shor's algorithm
        - Quantum Advantage

    - Long term goals and strategies being followed
        - Error correction
- Quantum Sensing (8-10 lectures)
    - Basics of quantum sensing
    - Basics of Photon (single and entangled) generation and detection
    - Gravimetry
    - Atomic clock
    - Magnetometry
    - State of the art in Quantum Sensing
- Quantum Communications (8-10 lectures)
    - Basics of digital communication
    - Quantifying classical information – Shannon entropy
    - Basic ideas of quantum communication, security, eavesdropping
    - Overview of quantum communication achievements
        - Terrestrial – fibre-based
        - Free space, Satellite-based
- **Topics on Quantum Materials are to be covered in the other portions of the course wherever required and are not listed separately here.**

Course Outcomes:

Students of this course learn:

1. The general physical principles of realising qubits for computation
2. The various hardware implementations of qubits for computation
3. The basic ideas of quantum sensing
4. The applications of quantum sensing
5. The implementations of quantum communications protocols in fibre-based and free-space

Course References:

1. Quantum Information Science – Manenti R., Motta M., 1st Edition, Oxford University Press (2023)
2. Quantum computation and quantum information – Nielsen M. A., and Chuang I. L., 10th Anniversary edition, Cambridge University Press (2010)
3. Elements of Quantum Computation and Quantum Communication, A. Pathak, Boca Raton, CRC Press (2015)
4. An Introduction to Quantum Computing, Phillip Kaye, Raymond Laflamme, and Michele Mosca, Oxford University Press (2006)
5. Quantum computing explained, David McMahon, Wiley (2008)

QT 02: Foundations of Quantum Technologies, 3:0 (Mandatory)

This course is meant for laying down the central theoretical aspects of quantum mechanics in a rigorous manner where students learn the techniques and develop a good intuition for quantum physics.

Course Content and syllabus:

- Quantum Mechanics (16 - 18 lectures):
    - Brief overview of classical physics (This segment is meant for the student to understand what a Hamiltonian is, which will feature later in quantum mechanics)
        - Hamiltonian function and Hamilton's equations
        - Phase-space description of a system
        - Connection and Equivalence with Newton's laws for simple systems – free particle, particle moving in a conservative potential, examples of Harmonic oscillator, hydrogen atom
    - Historical evolution of quantum mechanics
        - Planck's quantum hypothesis
        - Photo electric effect
        - Atomic spectra
        - Bohr's quantisation principle
        - De Broglie's Wave particle duality
    - Postulates of Quantum Mechanics
        - State vectors and Hilbert Space
        - Dirac Bra-Ket notation
        - Measurables and Hermitian Operators
        - Unitary Transformations
        - Schrodinger Equation and Time evolution of quantum states
        - Measurement Postulate
        - Schrodinger, Heisenberg and Interaction pictures
        - Eigen values, Expectation values and Matrix elements
        - Heisenberg's Uncertainty principle
    - Density operator formalism of quantum mechanics – pure and mixed states
    - Superposition and Entanglement in quantum mechanics
    - No cloning theorem
    - Applications of postulates –Particle in a box, Hydrogen atom, Harmonic Oscillator
    - Number states, ladder operators and Coherent states of a harmonic oscillator
    - Spin and Angular momentum – spin half particles
    - Rabi problem of a spin-half particle in a rotating magnetic field
    - Bosons and Fermions
- Statistical Physics (8-10 lectures)
    - Quick review of first and second laws of thermodynamics
    - Thermal Equilibrium and Gibbs principle
    - Applying Gibbs principle to Classical and Quantum harmonic oscillators

- Bosons and Fermions and Quantum statistics – Fermi-Dirac and Bose-Einstein distributions
- Information Science (3-4 lectures)
  - Digital communication and information
    - Quantifying information in terms of Shannon entropy
  - Basic ideas of quantum information
  - Decoherence and noise
  - Introductory ideas of Kraus operators
- Brief overview of Computational Complexity (5-6 lectures)
  - Qualitative ideas of a Turing machine
    - Types of Turing machines
  - Time and Space complexity – P vs NP, PSPACE
  - Quantum complexity classes – Q, EQP, BQP, BPP, QMA
  - Post Quantum Cryptography (PQC)

Course Outcomes:

Students of this course learn

1. The most relevant mathematical techniques
2. Basic postulates of quantum mechanics and applications
3. Basics of Statistical Physics
4. Basics of Information Science
5. Basics of computational complexity

Course References:

1. Introduction to Quantum Mechanics, Griffiths D. J., 3rd Edition, Cambridge University Press (2024)
2. Introduction to Electrodynamics, Griffiths D. J., 4th edition, Cambridge University Press (2020)
3. Principles of Quantum Mechanics, Shankar, R., 2nd edition, Springer (2014)
4. Quantum Information Science – Manenti R., Motta M., 1st Edition, Oxford University Press (2023)
5. Quantum computation and quantum information – Nielsen M. A., and Chuang I. L., 10th Anniversary edition, Cambridge University Press (2010)
6. A Pathak, Elements of Quantum Computation and Quantum Communication, Boca Raton, CRC Press (2015)
7. Information Theory, Robert B. Ash, Dover Publications (2003)
8. Introduction to the Theory of Computation, Michael Sipser, 3rd edition, Cengage India Pvt. Ltd. (2014)
9. Statistical Mechanics, Pathria R. K., Paul D. Beale, 4th edition, Academic Press, (2021)

QT 03: Basic Programming Lab (2:1)
(Out of QT 03 and QT 04, at least ONE is mandatory)

This course is meant to provide students a quick hands-on experience in scientific computing and its applications to areas within Quantum Technologies.

Course Content and syllabus:

- Basics of programming
    - Data structures, classes, Object-oriented programming
    - Data storage and retrieval, Memory allocation
    - Scientific plotting, documentation of codes
- Simple algorithms and benchmarking run time
    - Sorting
    - Searching
    - Arithmetic algorithms like GCD, Prime factorisation
- Numerical Integration and differential equations
    - Linear 2nd Order ODEs with constant coefficients
    - Linear 2nd order ODEs with variable coefficients
    - Boundary value problems
        - Poisson equation
        - Laplace equation
        - Wave equation
        - Diffusion Equation
- Numerical techniques in linear algebra
    - Matrix inverse
    - Eigenvalue problem
    - Diagonalisation of matrices
    - Singular value decomposition
- Numerical techniques in Probability and Statistics
    - (Pseudo) Random number generation
    - Computing statistical moments for data samples
    - Least Squares fitting
    - Error Analysis
    - Hypothesis Testing
    - Monte Carlo sampling
- Applications to Quantum Mechanics (can be done using openly available modules in languages like Python, Julia etc.)
    - Eigen energies of coupled two level systems
    - Eigen energies of two-level system coupled to oscillator (Jaynes-Cummings Model)
    - Driven two-level system – Rabi Problem
    - Driven damped oscillator — coherent states
- Applications to EM theory (e.g. magnetic field simulation)
    - Electrostatic charge distributions

- Magnetostatic current distributions
- Finite Element techniques for electromagnetic simulations

Course outcomes:

Students of this course learn

1. Basics of programming
2. To write programs to solve scientific problems
3. Techniques for scientific computing
4. Applications to quantum mechanics and electromagnetism

Course References:

Computational Physics, Nicholas Giordano, Hisao Nakanishi, 2nd edition, Pearson-Addison Wesley (2005)

QT 04: Basic Laboratory Course for Quantum Technologies (2:1)

(Out of QT 03 and QT 04, at least ONE is mandatory)

Course Content and syllabus:

- Optics
  - Interferometry – wavelength measurements, intensity measurements
  - Diffraction – single slit, grating
  - Microscopy – magnification, aberration
  - Polarization optics – PBS, HWP, QWP
- RLC circuits
  - Series and parallel RLC circuits – Verifying the quality factor formulae
  - Extracting intrinsic losses
- Digital circuits
  - Adder, Multiplier
  - Encoder, Decoder
  - D flipflop, shift registers
  - How to use common Integrated Circuit chips
- Radio Frequency Technology:
  - Using Oscilloscope
    - Ring-up and ring-down time measurements of RLC circuits
    - Measurements of different pulse-shapes generated by a function generator
  - Using Vector Network Analyser
    - Transmission and reflection measurements of coaxial cable in open, short and matched termination
    - Voltage standing wave ratio measurement
    - Amplitude and Phase quadrature, In-phase and Out-of-phase quadrature plots and Quality factor measurement of RLC circuits
    - Characterising S-parameters, ABCD and Z matrices of common 2 port networks – coaxial cable, attenuator, low pass high pass bandpass filters etc.
    - Characterising 3 port networks – directional couplers, circulators, isolators
  - Using a spectrum analyser
    - Noise from a resistor at different temperatures

- Interfacing instruments with a computer

- Data acquisition
  - Signal demodulation – heterodyne vs Homodyne, Mixing of signals
  - Sampling, digitisation using ADCs – under-sampling and aliasing, oversampling and noise
  - Averaging and interpolation techniques

- Quantum Simulators
    - Running quantum protocols in a quantum simulator
    - Implementing simple quantum algorithms on cloud-based quantum computers (depending on availability of time on such machines)
- Running simple algorithms on cloud-based quantum processors (optional)

Course outcomes:

Students of this course learn

1. Basic experimental techniques in optics
2. Basic experimental techniques in characterising resonators and RLC circuits
3. Basic digital circuits
4. Fundamental techniques in RF engineering
5. Interfacing instruments with computers and carry out data acquisition

Course References:

1. Optics, Eugene Hecht, A. R. Ganesan, 5th edition, Pearson (2019)
2. Art of Electronics, Paul Horowitz and Winfield Hill, 3rd edition, Cambridge University Press (2015)
3. Digital Design, Morris Mano, Michael D. Cilletti, 6th edition, Pearson Education (2018)
4. Microwave Engineering, David Pozar, 4th edition, Wiley (2013)
5. Discrete-time signal processing, Alan V. Oppenheim and Ronald W. Shaffer, 4th edition, Pearson (2009)
6. Optical quantum information and quantum communication, A. Pathak and A. Banerjee, SPIE Spotlight Series, SPIE Press (2016)

QT 05: Introduction to Quantum Computation 3:0

(Out of QT 05, QT 06, QT 07 and QT 08, at least ONE is mandatory)

Course Content and syllabus:

- Qubits versus classical bits
  - Spin-half systems and photon polarizations
  - Trapped atoms and ions
  - Artificial atoms using circuits
  - Semiconducting quantum dots
  - Single and Two qubit gates – Solovay - Kitaev Theorem
- Quantum correlations
  - Entanglement and Bell's theorems
- Review of Turing machines and classical computational complexity
  - Time and space complexity (P, NP, PSPACE)
- Reversible computation
- Universal quantum logic gates and circuits
- Quantum algorithms
  - Deutsch algorithm
  - Deutsch Josza algorithm
  - Bernstein - Vazirani algorithm
  - Simon's algorithm
- Database search
  - Grover's algorithm
- Quantum Fourier Transform and prime factorization
  - Shor's Algorithm.
- Quantum complexity classes – Q, EQP, BQP, BPP, QMA
- Additional Topics in Quantum Algorithms
  - Variational Quantum Eigensolver (VQE)
  - HHL
  - QAOA
- Introduction to Error correction
  - Fault-tolerance
  - Simple error correcting codes
- Survey of current status
  - NISQ era processors
  - Quantum advantage claims
  - Roadmap for future

Course outcomes:

Students of this course learn

1. To review the basic postulates of quantum mechanics

2. The theoretical basics of qubits and their physical realisations
3. To work with density operators and time evolution for mixed states
4. The basic ideas of quantum gates
5. The working of important quantum algorithms
6. The basics of quantum error correction

Course References:

1. Quantum Information Science – Manenti R., Motta M., 1st Edition, Oxford University Press (2023)
2. Quantum computation and quantum information – Nielsen M. A., and Chuang I. L., 10th Anniversary edition, Cambridge University Press (2010)
3. A Pathak, Elements of Quantum Computation and Quantum Communication, Boca Raton, CRC Press (2015)
4. Quantum error correction and Fault tolerant computing, Frank Gaitan, 1st edition, CRC Press (2008)
5. Quantum computing explained, David McMahon, Wiley (2008)
6. Introduction to Quantum Computing: From a lay person to a programmer in 30 steps, Hui Yung Wong, 1st edition, Springer-Nature Switzerland AG (2022)

QT 06: Introduction to Quantum Communication

(Out of QT 05, QT 06, QT 07 and QT 08, at least ONE is mandatory)

Course Content and syllabus:

- Basics of Polarization optics
    - Quarter and half-wave plates
    - Polarizing beam splitters
- Basics of linear and square-law detectors
    - Quadrature amplitude modulation
    - Heterodyne and Homodyne demodulation and linear detectors
    - Intensity measurements and square law detectors
    - Photomultipliers, Avalanche Photo diodes
- Digital communication – information theory (basics)
    - Information entropy
    - Noiseless channel encoding
    - Noisy channel encoding
- No cloning theorem
- Quantum Memories
- Quantum repeaters
- Entanglement and Bell Theorems
- Bell Measurements and Tests
- Quantum Teleportation protocol
- Quantum Dense coding
- Quantum Key Distribution protocols
    - BB84
    - E91
    - BBM92.
    - B92
    - COW
    - DPS
- Quantum Networks and Quantum Internet
- Survey of Hardware implementations
    - Free space communications
    - Satellite based communications
    - Fibre optics-based communications

Course Outcomes:

Students of this course learn

1. The basics of EM theory
2. The basics of photodetection
3. The basics of information theory

4. The central ideas in quantum communications

Course References:

1. Quantum computation and quantum information – Nielsen and Chuang Cambridge University Press, Cambridge (2010)
2. A Pathak, Elements of Quantum Computation and Quantum Communication, Boca Raton, CRC Press (2015)

QT 07: Introduction to Quantum Sensing 3:0

(Out of QT 05, QT 06, QT 07 and QT 08, at least ONE is mandatory)

Course Content and syllabus:

- Classical sensing
  - Photo detection
- Classical noise
  - Johnson Noise, Telegraph noise, flicker or 1/f noise
- Sensitivity of classical measurements
  - Classical Fisher information
  - Cramer - Rao bounds (information theory basics may be required here).
- Quantum measurements
  - projective/orthogonal measurements
  - Approximate/non-orthogonal measurements
  - Weak continuous measurements
  - Error-disturbance relations
  - Standard quantum limits
  - Quantum non-demolition measurements
- States of light
  - Fock states
  - Coherent states
  - Squeezed states
  - Tomography
  - Wigner quasi-probability distribution
  - P-distribution
  - Husimi Q function
- Quantum photo detection
  - Square-law detectors, Intensity measurements and Photo-detection
  - Linear Detectors and Quadrature Measurements
- Quantum Cramer-Rao bounds
- Single photon-based sensing applications
- Entanglement based sensing applications
- Atomic state-based sensing, solid-state spin-based sensing applications (gravimetry, magnetometry)

Course Outcomes:

Students of this course learn

1. The basics of classical sensing
2. Aspects of quantum measurement
3. Ways to quantify quantum sensing
4. About measurements of quantum states of light

5. About the applications of quantum sensing

Course References:

1. Quantum Measurement and Control, Howard Wiseman and David Milburn, Cambridge University Press (2014)
2. Quantum Measurement, Vladimir Braginsky and Farid Ya Khalili, Cambridge University Press (1995)
3. Quantum Information Science – Manenti R., Motta M., 1st Edition, Oxford University Press (2023)

QT 08: Introduction to Quantum Materials 3:0

(Out of QT 05, QT 06, QT 07 and QT 08, at least ONE is mandatory)

Course Content and syllabus:

- Band theory basics
  - Metals, Semiconductors and Insulators
  - Band structure of solids
  - Survey of semiconducting devices for quantum technologies (electronic, quantum optical devices and principle of operation)
- Correlated systems
- Magnetism
  - Para, ferro magnetism basics
  - Magnetic measurements, hall effect, magnetoresistance
  - Faraday and Kerr effects
- Superconductivity
  - BCS theory
  - Ginzburg Landau
  - Josephson Effect – AC and DC Josephson effects
  - Survey of superconducting devices for quantum technologies
- 2D materials
  - Graphene and its properties – single and few layers
  - Transition Metal Dichalcogenides – Electronic and Optical Properties
- Topological Phases of matter
  - Basics of Topology
  - Geometric phases - Berry Phase
  - Aharonov Bohm effect
  - Topological phases of matter
- Survey of material growth techniques
  - Molecular beam epitaxy
  - Chemical vapor deposition, MOVPE
  - Pulsed laser deposition, etc.
  - Crystal growth techniques

Course Outcomes:

Students of this course learn

1. The basic idea of quantum materials
2. The basics of band theory of solids
3. The basics of magnetism
4. The basics of superconductivity
5. About new 2D materials like graphene, TMDCs
6. About topology and topological phases of matter

Course References:

1. Condensed Matter Physics, M P Marder, 2nd Edition, John Wiley and Sons, 2010
2. Introduction to Superconductivity, Michael Tinkham, standard ed., Medtech (2017)

QT 09: Engineering Foundations of Quantum Technologies 3:0 (optional / additional)

This course is meant to cover topics in electrical, electronics and communication engineering, as well as in computer science that are relevant to Quantum computation, Communications and Sensing. This is a survey course and not meant for a rigorous treatment of each topic.

Course Content and syllabus:

- Electrical Networks (4 hours)
  - Analog RLC circuits – resonances, impedances, quality factors
  - Transmission line basics (2 hours)
    - Telegrapher equations, wave impedance, impedance matching, transmission line resonators
- Computer Science (15 hours)
  - Basics of computer architecture (1 hour)
    - Arithmetic Logic Unit
    - Memory
  - Abstract models of computation (12 hours)
    - Finite State Machine
    - Turing Machines
    - Overview of Hierarchy of languages – Regular, Context-Free, Turing Decidable and Turing Recognisable
  - Complexity Theory (2 hours)
    - Time and Space complexity
    - P vs NP, NP-completeness
- Electrical Communications (1 hour)
  - Analog Communications (1 hour)
    - Quadrature amplitude modulation
    - Heterodyne and Homodyne demodulation
- Noise and Signals (6 hours)
  - Characterising Noise
  - Types of Noise
    - Shot Noise
    - Johnson-Nyquist Noise
    - Telegraphic noise or flicker or 1/f noise
  - Signal conditioning and noise mitigation
  - Amplification and Added Noise
    - Linear Amplifier theory

        - Signal-Noise Ratio, Added Noise, Noise Figure of amplification
        - Dynamic Range
        - Noise temperature
        - Quantum limits on noise in linear amplifiers
- Digital Communications (4 hours)
    - Information entropy
    - Noiseless channel encoding
    - Noisy channel encoding
- Basics of cryptography (6 hours)
    - Basics of Number Theory
    - Random Number Generation
    - One time pad, Private key, public key, symmetric and asymmetric cryptography protocols
    - RSA and DH
    - Post Quantum Cryptography (PQC)

Course Outcomes:

Students of this course learn

1. Relevant topics from Electrical Networks to design and analyse analog circuits
2. Relevant topics from RF and Microwave Engineering to design systems
3. Relevant topics in Theory of computation to benchmark algorithms
4. Relevant topics in analog and digital communications
5. Basics of cryptography

Course References:

1. Art of Electronics, Paul Horowitz and Winfield Hill, 3rd edition, Cambridge University Press (2015)
2. Digital Design, Morris Mano, Michael D. Cilletti, 6th edition, Pearson Education (2018)
3. Microwave Engineering, David Pozar, 4th edition, Wiley (2013)
4. Information Theory, Robert B. Ash, Dover Publications (2003)
5. Introduction to the Theory of Computation, Michael Sipser, 3rd edition, Cengage India Pvt. Ltd. (2014)
6. Protecting Information – From Classical error correction to quantum cryptography, Susan Loepp and William K. Wootters, Cambridge University Press (2006)

QT 10: Solid State Physics for Quantum Technologies 3:0 (optional / additional)

Course Content and syllabus:

- Structure of solids –
  - Symmetry, Bravais lattices
  - Laue equations and Bragg's law,
  - Brillouin Zones
  - Atomic scattering and structure factors.
- Characterisation of crystal structures – XRD etc.
- Bonding in solids –
  - van der Waals and Repulsive interactions,
  - Lennard Jones potential,
  - Madelung constant
- The Drude theory of metals –
  - DC & AC electrical conductivity of a metal;
  - Hall effect & magnetoresistance,
  - Density of states, Fermi-Dirac distribution, Specific heat of degenerate electron gases
  - Free electron model
- Beyond the Free electron model
  - Kronig-Penney Model
  - Periodic potential – Bloch Theorem
  - Band theory
  - Tight binding model
- Phonons in Solids
  - One dimensional monoatomic and diatomic chains
  - Normal modes and Phonons
  - Phonon spectrum
  - Long wavelength acoustic phonons and elastic constants
  - Vibrational Properties- normal modes, acoustic and optical phonons.
- Magnetism
  - Dia-, Para-, and Ferromagnetism
  - Langevin's theory of paramagnetism
  - Weiss Molecular theory
- Superconductivity:
  - Phenomenological description – Zero resistance, Meissner effect
  - London Theory
  - BCS theory
  - Ginzburg-Landau Theory
  - Type-I and type-II superconductors
  - Flux quantization
  - Josephson effect.
  - High Tc superconductivity

Course Outcomes:

Students of this course learn

1. Basics of solid states physics
2. Various approximations for electronic states in matter
3. The theory of phonons in solids
4. The theory of magnetism
5. The theory of superconductivity

Course References:

1. Introduction to Solid State Physics, Charles Kittel, Wiley India Edition (2019)
2. Condensed Matter Physics, M P Marder, 2nd Edition, John Wiley and Sons (2010)
3. Introduction to Superconductivity, Michael Tinkham, standard edition, Medtech (2017)

QT 11: Quantum Optics 3:0 (optional / additional)

Course Content and syllabus:

- Quantization of the electromagnetic field
  - Number states, coherent states, squeezed states
  - Hanbury-Brown and Twiss experiments – Photon bunching, Photon anti bunching
  - Hong-Ou-Mandel interference
- Theory of Optical coherence
  - Young's double slit experiment and first order coherence
  - Coherence functions of arbitrary order
  - Normal ordering, symmetric ordering and ani-normal ordering of operators
  - Interferometry
- Phase-space representations of states of light
  - Wigner distribution
  - P-function and the notion of non-classicality with some examples of nonclassical states like squeezed states and their applications
  - Husimi Q function
- Light-matter interaction
  - Classical model of light-matter interaction
  - Semi-classical model of light-matter interaction-
  - Quantum light-matter interaction
  - Rabi Model
  - Jayne's-cummings model
- Open quantum systems
  - Fermi golden rule
  - Born-Markov Lindblad Master Equation

Course Outcomes:

Students of this course learn

1. To quantise the electromagnetic field
2. The various experimental techniques in photonics
3. The various representations of states of light
4. Classical, semi-classical and fully quantum models of light-matter interaction
5. Modelling decoherence through Master equation

Course References:

1. Introductory Quantum Optics, Christopher Gerry and Peter Knight, Cambridge University Press (2004)
2. Quantum Optics, D. F. Walls, Gerard J. Milburn, 2nd Edition, Springer (2008)

3. Quantum Optics: An introduction, Mark Fox, Oxford University Publishers (2006)
4. Quantum Optics for Beginners, Z. Ficek and M. R. Wahiddin, 1st edition, Jenny Stanford Publishing (2014)

National Institute of Technology, Warangal

Senate Protocol

Preamble:

In its 132nd meeting held on April 30, 2024, the Senate requested Prof. Venkaiah Chowdary (Senate Member) to prepare the protocol to be followed in a Senate meeting for its effective conduct. Subsequently, the draft Senate protocol was prepared and submitted to the Senate for approval. The Senate, after deliberating on the draft Senate protocol in the 138th meeting held on November 18, 2024, constituted a committee with the following members: Prof. D.V.S.S. Siva Sarma (EE), Prof. Venkaiah Chowdary (CE), and Prof. D. Kasinath (CY). This committee has been requested to revise the draft Senate protocol after receiving comments/suggestions from the Senators apart from referring to Senate protocols of other IITs and NITs. Subsequently, the draft Senate protocol was revised and submitted to the Senate for approval.

The Senate Protocol consists of the following sections:

1. The Senate
2. Powers of the Senate
3. Chairman of the Senate to exercise powers in emergency
4. Members of the Senate and invitees
5. Senate procedure
6. Conduct and etiquette

1. The Senate:

The Senate is one of the authorities of the Institute next to the Board of Governors (The National Institutes of Technology (Amendment) Act, 2012). Subject to the provisions of the NIT Act, the Statutes and the Ordinances, the Senate shall have the control and general regulation, and be responsible for the maintenance of standards of instruction, education and examination in the Institute and shall exercise such other powers and perform such other duties as may be conferred or imposed upon it by the Statutes. The Senate consists of the following persons, namely:

(a) the Director, *ex officio*, who shall be the Chairman of the Senate;

(b) the Deputy Director, *ex officio*;

(c) the Professors appointed or recognized as such by the Institute for the purpose of imparting instructions in the Institute;

(d) three persons, one of whom shall be a woman, not being employees of the Institute, to be nominated by the Chairperson in consultation with the Director, from amongst educationists of repute, one each from the field of science, engineering, and humanities; and

(e) such other members of the staff as may be laid down in the Statutes.

The Registrar shall act as the Secretary of the Senate.

Subject to the provisions of the NIT Act and the Statutes, the Ordinances of the Institute shall be made by the Senate, and the Ordinances may provide for all or any of the following matters, namely:

(a) the admission of the students to the Institute;

(b) the courses of study to be laid down for all degrees and diplomas of the Institute;

(c) the conditions under which students shall be admitted to the degree or diploma courses and to the examinations of the Institute, and shall be eligible for degrees and diplomas;

(d) the conditions of award of the fellowships, scholarships, exhibitions, medals and prizes;

(e) the conditions and mode of appointment and duties of examining bodies, examiners and moderators;

(f) the conduct of examinations;

(g) the maintenance of discipline among the students of the Institute; and

(h) any other matter which by the NIT Act or the Statutes is to be or may be provided for by the Ordinances.

No act of the Senate, shall be invalid merely by reason of-

(a) any vacancy or defect in the constitution thereof, or

(b) any defect in the election, nomination or appointment of a person acting as a member thereof, or

(c) any irregularity in its procedure not affecting the merits of the case.

2. Powers of the Senate:

Subject to the provisions of the NIT Act and the Statutes, the Senate shall have power to:

2.1. Frame and revise curricula and syllabi for the courses of studies for the various Departments and Centres.

2.2. Make arrangements for the conduct of examinations; appointment of examiners, moderators, tabulators and other matters relating to the examinations.

2.3. Declare the results of the examinations or to appoint Committees or Officers to do so and to make recommendations to the Board regarding conferment or grant of degrees, diplomas and other academic distinctions or titles.

2.4. Appoint Advisory Committees or Expert Committees or both for the Departments or Centres of the Institute to make recommendations on academic matters connected with the working of the Departments or Centres.

2.5. Appoint Committees from amongst the members of the Senate, other faculty members of the Institute and experts from outside to advise on such specific and important academic matters as may be referred to any such Committee by the Senate.

2.6. Consider the recommendations of the Advisory Committees attached to various Departments or Centres and that of Expert and other Committees and take such action (including the making of recommendations to the Board) as included by each case.

2.7. Make periodical review of the activities of the Departments or Centres and take appropriate action (including the making of recommendations to the Board).

2.8. Supervise the working of the Library of the Institute.

2.9. Promote research and academic development or activity within the Institute and seek reports on such research or academic development or activity from the persons engaged therein.

2.10. Provide for the inspection of the Classrooms, Laboratories, Library, and the Residential Hostels.

2.11. Plan co-curricular activities of the students of the Institute.

2.12. Award stipends, scholarships, medals and prizes and make other awards in accordance with such conditions as may be attached to the awards.

2.13. Make recommendations to the Board with regard to the creation or restructuring of Departments or Programmes or Centres and the abolition of existing Departments or Centres thereof.

2.14. Make recommendations to the Board to disseminate knowledge through distance learning mode to various parts of the State or Country or abroad.

2.15. Nominate one Professor and one Associate Professor of the Institute as members of the Board of Governors.

2.16. Invite up to two student representatives during discussion of general nature not involving policy or disciplinary matters in the Senate meetings.

3. Chairman of the Senate to Exercise Powers in Emergency:

If, in the opinion of the Chairman of the Senate, any emergency has arisen which requires immediate action, he/she may take such action as he/she deems necessary and shall report the same for approval to the Senate in its next meeting.

4. Members of the Senate and Invitees:

4.1. All Professors are members of the Senate. However, if any Department does not have any Professor, or if the Head of the Department is not a Professor, the Director, in his/her discretionary power, invites the Head of the Department below the rank of Professor to the

Senate as an invited member for representing the Department in the Senate. Such invitations are not transferrable. If such a member is going on leave, he/she may request in writing to the Chairman of the Senate to invite the In-charge faculty member (if a non-member) to attend the Senate meeting and receive approval before the Senate meeting. The In-charge Faculty member can attend the Senate meeting only if the request is approved by the Chairman and a formal invitation letter is received from the Registrar. Similarly, Professors, Heads of Departments, and Deans cannot nominate any other faculty member who is not a member of the Senate to represent him/her in his/her absence.

4.2. Members of the Senate on long leave (sabbatical, deputation, lien, extraordinary leave) will receive an invitation and agenda through e-mail. Such members may participate in the meetings at their discretion but shall not participate in voting if one is necessary.

4.3. Certain occasions may require a non-Senator to participate in the Senate discussion. Should such a situation arise, the Secretary of the Senate, upon the approval of the Chairman of the Senate, may invite a non-Senator to participate and speak on a specific agenda item or subject to add more information on the topic, given his/her expertise on the subject. Such an invitee can attend either the relevant portion only or the full meeting of the Senate but is not expected to speak outside the agenda item for which he/she has been invited.

4.4. Associate Dean (Academic Undergraduate), Associate Dean (Academic Postgraduate), Associate Dean (Academic Research Programmes), Associate Dean (Examination)/Faculty-In-Charge (Examination), Deputy Registrar (Academic), and Assistant Registrar (Academic) shall be the permanent invitees to the Senate.

4.5. All non-member invitees, except Associate Deans, Deputy Registrar, and Assistant Registrar, will fully participate in the proceedings without distinction between members and invitees. But in the unlikely event of a vote being taken, they will not participate in voting.

5. Senate Procedure:

5.1. The Senate shall meet as and when necessary but ordinarily not less than four times during a calendar year. An emergency senate meeting can be convened as and when required.

5.2. The Chairman of the Senate shall convene the Senate meeting either on his/her motion or on a requisition signed by not less than one-fifth members of the Senate. The written notice and agenda of the Senate meeting will be issued and circulated by the Registrar at least a week before the Senate meeting.

5.3. If the situation so demands, the Director, in his/her capacity as Chairman of the Senate, may call an urgent Senate meeting at short notice to consider urgent special issues.

5.4. The Secretary of the Senate shall prepare the Senate Agenda in consultation with the Dean (Academic). The draft agenda will be put up through the Dean (Academic) by the Registrar for approval of the Director and subsequent circulation among the Senate members.

5.5. The quorum for the Senate meeting is one-third of the total members of the Senate.

5.6. The agenda items in a senate meeting will be discussed in two parts: with and without student nominees. Only the students' representations will be discussed in the presence of the student nominees. Preferably, table and non-agenda items may be kept to a minimum for effective discussion on the agenda items.

5.7. The Senate discussion should be based only on the agenda items. If any non-agenda urgent item needs to be discussed, the same should be proposed to the Chairman of the Senate before the Senate meeting in writing, and only with his/her approval the item can be discussed. However, the Chairman can bring a non-agenda item to the floor of the Senate for discussion.

5.8. Remarks or comments on a particular agenda item under discussion must be addressed to the Chairman of the Senate only, and the Senate members must not address each other directly. Senate members are also advised to refrain from using personal comments about the Senators even when opposing an agenda item and are expected to conduct themselves with high academic professionalism.

5.9. After an agenda item is presented for open discussion among Senators, the proposer is usually offered the chance to speak first. For effective and detailed deliberations, the speakers are expected to confine themselves to agenda items only, be brief and precise, and avoid repetitions so that multiple viewpoints can be heard before arriving at a decision.

5.10. The speakers must obtain permission from the Chairman of the Senate to speak on an agenda item, address their remarks to the Chairman of the Senate, and maintain a courteous tone.

5.11. The Registrar, the Academic Associate Deans, the Deputy Registrar, and the Assistant Registrar shall be responsible for providing necessary information and accurately preparing the Senate minutes. Unless specifically requested by the Chairman of the Senate, the Academic Associate Deans, the Deputy Registrar, and the Assistant Registrar shall not hold a viewpoint on issues, nor will they participate in the discussions.

5.12. As a matter of decorum, members will refrain from citing views or directions of political and bureaucratic dignitaries, members of the Board of Governors, and comparable senior functionaries that may influence the decision of the Senate. However, official communications from such offices may constitute a part of the formal agenda documentation.

5.13. The ruling of the Chairman of the Senate concerning all questions and procedures shall be final and binding.

5.14. If, in the opinion of the Chairman of the Senate, any exigency situation requires immediate action, he/she may take the appropriate action as deemed necessary, and the same will be reported to the Senate for approval in its next meeting.

5.15. During the Senate meeting, if the situation so demands, the Chairman of the Senate may ask a Senator to leave the Senate meeting or, in extreme cases, may adjourn the meeting. However, since all the Senators are very dignified personalities, this clause is never expected to be required to be used.

5.16. If a Senator fails to attend five consecutive Senate meetings without leave of absence from the Dean (Academic), such a Senator shall cease to be a member of the Senate. However, such a Senator can appeal to the Senate to reinstate the Senate membership.

5.17. The Registrar, in consultation with the Dean (Academic) and with the help of the Academic Associate Deans, the Deputy Registrar, and the Assistant Registrar, will prepare the first draft minutes and put them up to the Dean (Academic) for his/her comments. After incorporating the suggestions and mutual agreement, the Secretary of the Senate will submit the draft minutes to the Chairman of the Senate through the Dean (Academic) for approval. Differences, if any, are to be marked for the final decision of the Chairman of the Senate. The Registrar, the Dean (Academic), and the Director will sign the draft Senate minutes. After approval by the Director, the Senate minutes will be circulated to all the members through e-mail with the heading “Unconfirmed XYZth Senate Minutes", where XYZ represents the Senate meeting number. The final and confirmed minutes will be archived after confirmation of the minutes in the next Senate meeting. While writing the minutes, if, in the opinion of the Director, circulation of an agenda discussion or part thereof is prejudicial to the interest of the Institute or the Government of India, the same shall not be circulated.

6. Conduct and Etiquette:

6.1. All the Senators are expected to uphold the highest integrity and etiquette in the Senate Hall during the meeting.

6.2. All the Senators shall occupy the chairs at least ten minutes before the scheduled time of the Senate meeting.

6.3. Mobile phones should be in silent mode, and the usage of mobile phones “in any manner” shall strictly be avoided in the Senate Hall. Urgent calls shall only be attended outside the Senate Hall.

6.4. A Senator shall always address the Chairman of the Senate from his/her seat through the microphone only. Cross-talks shall strictly be avoided during the Senate Meeting.

6.5. A Senator shall express his/her opinion in the shortest possible time and should be straight to the point. This will provide adequate opportunities for the remaining Senators to express their views.

6.6. Each Senator can have a different point of view on each agenda item, and it becomes difficult to arrive at a consensus. In such instances, the Chairman of the Senate can always intervene and conclude a discussion in the best interest of the Institute and to save time. Further, the Chairman of the Senate will consensually summarize the discussion on each agenda item.

6.7. All the Senators should strictly adhere to the "Senate Agenda". Any points outside the agenda shall only be discussed after all the "Senate Agenda" items have been discussed. Further, any such discussion can only be initiated with prior approval of the Chairman of the Senate.

6.8. The Agenda Items discussed in the Senate and resolutions thus made shall remain confidential until the official publication of the Senate Minutes. In emergencies, the Chairman of the Senate will authorize the respective authorities to release specific orders or notifications even before the official publication of the Senate Minutes.

6.9. Student representatives can only participate in the discussions related to their representations and shall leave the Senate Hall immediately after completing the discussions related to Student representations.

6.10. A Senator shall submit a request for "leave of absence" to the Dean (Academic) well in advance if he/she cannot attend the scheduled Senate meeting.

Conclusion:

After approval by the Senate, the Senate protocol is expected to be followed by all the members of the Senate, including the special invitees.

Annexure-3

Guidelines for Change of supervisor

The committee felt that any request for a change of supervisor from the scholar or faculty side must be submitted within one year from the date of admission. No such request will be considered after one year of admission and the scholar has to leave the Ph.D. program in case of any such request.

Further, the Committee suggests the following course of action when a request is made for the change of the Supervisor:

a) When a scholar requests a change of Supervisor, the DSC should hold a preliminary inquiry. The concerned HOD should also attend this meeting.
b) The Chairman and the other members would hear the scholar's grievances that warranted such a drastic step, *in the absence of the Supervisor*.
c) The scholar is expected to produce valid proof of his/her claims.
d) The DSC would then hear the version of the Supervisor in the absence of the scholar.
e) The DSC, after the cross-verification of the versions presented by both parties, in their presence, shall try to make a reconciliation.
f) The DSC should assess if the scholar wants the change because he/she is not coping with the academic pressure put up by the supervisor.
g) If it is found that the Supervisor didn't put up undue pressure, the plea of the scholar for the change of the Supervisor shall be summarily rejected.
h) If the DSC finds merit in the argument put forth by the scholar, the case shall be referred to the RPEC for further inquiry.
i) The RPEC would then admit the case and decide if the change of supervisor is necessary after carrying out a thorough inquiry.

The following course of action is adopted if a Supervisor wants to abandon a scholar:

a) The DSC is convened by the Supervisor. The concerned HOD should also attend this meeting.
b) The Supervisor, in the absence of the scholar, presents the circumstances that led to his/her decision to abandon the scholar.
c) The DSC would then verify the veracity of these statements by summoning the scholar.
d) The DSC shall examine if there exists a merit in the case put forth by the faculty.
e) The DSC shall make an effort to reconcile the supervisor and the scholar.
f) If the DSC finds merit in the argument put forth by the Supervisor, the case shall be referred to the RPEC for further inquiry.
g) The RPEC would then admit the case and decide if the change of supervisor is necessary after carrying out an inquiry.

NATIONAL INSTITUTE OF TECHNOLOGY
Warangal- 506004, Telangana State, India

Date: 16th Jan 2025

Submitted to the Chairman, Senate

Sub: Report of the committee constituted to review the process of nominating faculty members to the BOG by the Senate.
Reference: Order dated 31-12-2024

Currently, one Professor and one Associate'Professor are being nominated by the Senate to serve as the BOG members based on their service seniority. A committee was constituted to review the procedures being followed by the other NITs.

The Committee reviewed on the practices prevailing in peer institutions (NITs) and noted that there exist three models:

a) **Elections:** In several institutions, elections are held to select the BOG members. A competent authority, nominated by the Director, issues the election notification. Interested faculty members, duly proposed and seconded by their colleagues, file their nominations. After a window of about two to three days for the withdrawal of their nomination, elections are held in one of the senate meetings. Generally, these elections are held just before the end of the tenure of the outgoing BOG members, and before a forthcoming BOG meeting. The elections are kept as the last agenda item of the said senate meeting. The secret voting method is adopted in almost all institutions.

b) **Nomination by the Director:** In a few institutes, the Director proposes faculty members as the new BOG members, based on their competencies among the senior Professors of the Institute. The proposal of nomination by the Chairman is placed before the Senate for ratification.

c) **Search Committee:** In some institutions, the Director appoints a search committee, generally consisting of the Dean (FW), the outgoing BoG members, and some faculty members to recommend the new BOG members, recognizing their suitability. The committee considers candidates from Professors and Associate / Assistant Professors based on their seniority, academic merit, administrative capability, commitment, contribution to the institute, promise, and enthusiasm. After due deliberations, the Senate ratifies these selections. It is also noted that only in NIT Warangal the Senate nominates the faculty members to the BOG based only on seniority.

Recommendation of the Committee

The first model, though appears the most democratic, can promote animosity amongst the contenders affecting the harmony of the institution. The second model has its shortcoming of only the nomination by the Chairman. After a lot of deliberation in the committee, it is observed that the third model does not seem to have any notable lacunae and is the most suitable model for our institute. Thus, this committee recommends that a Search Committee be appointed to suggest the BOG members to the Senate.

(Prof. P.V. Suresh) (Prof. S. Anuradha) (Prof. V.T. Somasekhar)

16/1/25

Annexure-5

Report of SPGC on the PG curricula

1. Minor Project (2 credits) : 2nd Sem

General guideline : The component is introduced for PG students in line with the Design Thinking for UG students. The students need not be assigned a formal guide for this project. A group of 2-3 students can choose any faculty for guidance and can do a project assigned. It is advisable to restrict to only one team for a faculty. It is preferable to work on a real world problem statement as mentioned in the curriculum. A department constituted panel will evaluate the project with rubrics defined by the department.

2. Seminar and Technical Writing (2 credits) – 3rd Sem

Notes : As per the existing rules, the student has to attend at least 5 seminars/ expert talks in the institute, and is expected to consolidate the ideas from these lectures or patent searches and prepare a report. The Civil department has a different method of implementation

3. Summer Internship / Research Experience (2 credits) – 3rd sem

To be completed during the summer after the 2nd semester and the work to be presented before an evaluation committee.

Notes : During the 3rd semester of M.Tech programs, the students have to present to 4 different committees (Seminar committee, Internship committee, CV committee, Dissertation Part-A committee).

To save time, we can complete Internship and seminar presentations during the registration process of 3rd semester; and CV, Dissertation Part-A presentations at the end of 3rd semester.

Or, the Internship and the seminar presentations can be taken during the mid-review of Part-A dissertation.

4. Major Project /Dissertation (20 credits for M.Tech and 8 credits for other PG programs) – 3rd and 4th Semesters

Guidelines for constitution of committees:

The PG dissertation committee, should contain at least, one Professor, one Associate Professor and one Asst Professor, faculty advisor along with Professor in charge of the program, a maximum of five members.

Notes : All committee members, give the marks as per the rubrics, put it in a sealed envelope and submit to Professor in charge or HoD. The individual committee member's marks are not to be displayed openly in any meeting. It is advised to the committee members not to award zero marks for any rubric and give some minimum marks. It is also advised to the supervisors not to award zero or 100% marks for the project.

Guidelines for evaluation:

The following guidelines are in place for evaluating M.Tech Thesis:

40% Guide Marks

20% Mid Semester Review

40% End Semester Review

However, as per **2024-135-Senate-11 item (2-8-24) , senate has approved the** M.Tech dissertation evaluation as :

Mid Sem: 40%, End Sem: 60%

In both Mid Sem and End Sem the evaluation shall be made as follows:

Supervisor : 40% (16 and 24 marks)

Dissertation Report : 20% (8 and 12 marks)

Evaluation by the Board [Proposed by the HoD and approved by Dean (Academic)] : 40% (16 and 24 marks)

Note for Industry based projects: SPGC proposes 60% marks for the Industry Supervisor and 40% to the committee/internal guide. The external guide may be invited during presentation (online). The marks from Industry guide are to be directly sent to the HoD/Prof in charge. It is mandatory for the student to attend both mid and end reviews.

The candidates who go to Industry for dissertation should present only that work. No other project should be assigned by the faculty

Head, CCPD should bring the clauses 16.3 and 16.4 of the PG regulations to the notice of the company regarding disclosing the results of the work.

5. Clarity on the rule position for makeup examination for U grade candidates (15.4 and 15.5)

The rule is giving only one chance for the student to clear the subjects of "U" grade in makeup examinations. If the student gets "U" grade again in makeup, he/she has to register in "Study mode". But the PG students while doing dissertation at Industry during the 3rd semester or 4th Semester cannot register for study mode.